REMARKS

The applicants appreciate the Examiner's thorough examination of the Application and request reexamination and reconsideration of the Application in view of the following remarks.

Claims 31-33 and 42 stand rejected under 35 U.S.C. §112, second paragraph. Applicants herein amend these claims to correct the claim dependency in claims 31-33 and to correct typographical errors in 29, 32-33, and 42. No new matter is added by these amendments and the amendments are not made for reasons related to patentability because they only correct typographical errors.

Claims 26-40 and 42 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 5,212,988 to White et al. in view of U.S. Patent No. 5,918,258 to Bowers.

The subject invention results from the realization that a truly effective mass determining device is obtained by driving the membrane of a flexural plate wave sensor at a reference resonant frequency, placing a substance on the membrane of the flexural plate wave sensor, determining the frequency change in the membrane as the result of the deposition of the substance on the membrane, and determining the mass of the substance based on the change in the frequency within the membrane. The moisture content of the substance can be determined by determining the mass of the substance based on the frequency change within the membrane, evaporating moisture contained within the substance and determining the mass of the substance after the moisture is driven off.

White et al. shows an ultrasonic sensing device that uses a Lamb wave propagation medium. White et al. describes that the described apparatus marks a departure from the use of

SAWs or Rayleigh waves in ultrasonic sensors and instead employs Lamb waves. White et al. do not disclose, however, depositing a measured quantity of a solution on a sensor having a membrane layer and allowing the solution to evaporate until particles remain on the membrane layer, as claimed by Applicants. Furthermore, White et al. also does not disclose or suggest automatically calculating the concentration of particles in the solution based upon the measured quantity of the solution and the mass of the particles. To overcome these deficiencies of White et al., the Examiner combines White et al. with Bowers.

In Applicants' last Response, it was submitted that the Examiner's combination of White et al. and Bowers is improper since White et al. strongly teaches away from combining it with a reference such as Bowers. In response to Applicants' arguments, the Examiner stated in the Office Action dated June 18, 2004 that:

> Bowers is relied upon merely to suggest a particular utility for the sensor of White et al., namely, in a particular evaporation system that may employ the sensor of White et al. as a deposition monitor. The level of ordinary skill in the resonant sensor art is high, and it is within the level of ordinary skill in the art to seek to extend the utility of a resonant sensor of general utility to applications of particular utility. Accordingly, it would have been within the level of ordinary skill in the art to seek to extend the utility of the resonant sensor of White et al. as a deposition monitor in an evaporation system to the specific utility as a deposition monitor in an evaporation system for measuring the level of non-volatile residue in the liquid, and Bower would have suggested such specific utility to one of ordinary skill in the art.

In short, the Examiner's motivation for combining the references is that the level of skill in the art is allegedly high. The caselaw is clear, however, that it is improper to combine references merely because the level of skill in the art may be high.

> This court has identified three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings

> of the prior art, and the knowledge of persons of ordinary skill in the art. In this case, the Board relied upon none of these. Rather, just as it relied on the high level of skill in the art to overcome the differences between the claimed invention and the selected elements in the references, it relied upon the high level of skill in the art to provide the necessary motivation. The Board did not, however, explain what specific understanding or technological principle within the knowledge of one of ordinary skill in the art would have suggested the combination. Instead, the Board merely invoked the high level of skill in the field of art. If such a rote invocation could suffice to supply a motivation to combine, the more sophisticated scientific fields would rarely, if ever, experience a patentable technical advance. Instead, in complex scientific fields, the Board could routinely identify the prior art elements in an application, invoke the lofty level of skill, and rest its case for rejection. To counter this potential weakness in the obviousness construct, the suggestion to combine requirement stands as a critical safeguard against hindsight analysis and rote application of the legal test for obviousness.
>
> Because the Board did not explain the specific understanding or principle within the knowledge of a skilled artisan that would motivate one with no knowledge of Rouffet's invention to make the combination, this court infers that the examiner selected these references with the assistance of hindsight. This court forbids the use of hindsight in the selection of references that comprise the case of obviousness. See In re Gorman, 933 F.2d 982, 986, 18 USPQ2d 1885, 1888 (Fed. Cir. 1991). Lacking a motivation to combine references, the Board did not show a proper *prima facie* case of obviousness. This court reverses the rejection over the combination of King, Rosen, and Ruddy.

In re Rouffet, 149 F.3d 1350, 47 U.S.P.Q.2d 1453, 1458 (Fed. Cir. 1998) (emphasis added). Similar to the case of In re Rouffet, the Examiner in the present case fails to provide sufficient motivation or teaching to combine the references of White et al. and Bowers. Rather, the Examiner asserts that the "level of ordinary skill in the resonant sensor of art is high, and it is within the level of ordinary skill in the art to extend the utility of a resonant sensor of general utility to application of particular utility." As the court noted in In re Rouffet, "[i]f such a rule invocation could suffice to supply a motivation to combine, the more sophisticated scientific

fields would rarely, if ever, experience a patentable technical advance." *Id.*

Since the level of the art does not provide proper motivation to combine references, the Examiner's combination of White et al. and Bowers is improper since White et al. strongly teaches away from combining it with a reference such as Bowers. Throughout the Background of the Invention and the Summary of the Invention, White et al. describes the disadvantages of using SAW sensing devices, such as that disclosed in Bowers. For example, White et al. teach that:

> A number of problems arise in SAW sensing devices due to SAW characteristics or to the characteristics of the medium required for SAW propagation. One such problem is that it is difficult to operate SAW sensors while they are immersed in most liquids, a problem rendering them inappropriate for many biological and chemical sensing applications. The reason is that when SAW devices are immersed, the SAW velocity is higher than the velocity of sound waves through the liquid; a large amount of the SAW energy is therefore radiated into the liquid, and the wave is attenuated as it travels along the propagation medium.

(Emphasis added.) (White et al. at column 2, lines 1-12.) White et al. further teaches away from combining it with SAW sensing devices:

> The invention marks a departure from the use of SAWs or Rayleigh waves in ultrasonic sensors and employs instead Lamb waves, which are also known as plate mode waves. Lamb waves can propagate only a material of finite thickness. In contrast to SAWs, which require a propagation medium having a thickness on the order of tens to hundreds of times the wavelength of the SAW propagating therethrough, Lamb waves require a propagation medium which is at most only several wavelengths thick.

(Emphasis added.) (White et al. at column 3, lines 11-20.) White et al. further teaches that:

> Thus the sensor may be operated while immersed in fluids. This is in contrast to SAW sensors, in which SAW velocities are higher than the velocity of sound through most fluids, a characteristic which renders typical SAW sensors inappropriate for operation while immersed in fluids.

(Emphasis added.) (White et al. at column 5, lines 49-54.) Many other references are in White et al. that teach against the use of SAW sensing devices. Thus, White et al. strongly teaches away from the use of SAW sensing devices and thus strongly teaches against the combination of White et al. with Bowers. Thus, the combination of these references is clearly improper.

Claim 26 of the subject invention cites, "A method of measuring the concentration of particles in a solution, the method comprising: depositing a measured quantity of the solution on a sensor having a membrane layer; allowing the solution to evaporate until the particles remain on the membrane layer; driving the membrane layer at a reference resonant frequency; detecting the shift in frequency of the membrane layer due to the mass of the particles; determining the mass of the particles based on the shift in frequency; and based on the measured quantity of the solution and the mass of the particles, automatically calculating the concentration of the particles in the solution." As noted above, White et al. does not teach or suggest allowing a solution to evaporate until particles remain on a membrane layer and automatically calculating the concentration of the particles in the solution. The combination of White et al. with Bowers to overcome the deficiencies of White et al. is clearly improper since White et al. strongly teaches against the combination of it with Bowers. Independent claims 28 and 30 recite similar features that distinguish over the combination of White et al. and Bowers.

Accordingly claims 26-40 and 42 are patentable over the prior art. Applicants respectfully request that the Examiner withdraw the rejection of these claims.

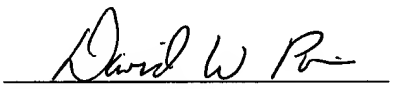
Claim 41 stands rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over White et al. in view of Bowers and further in view of Ballato. However, since claim 41 depends from independent claim 28, claims 41 is patentable for at least the reasons stated above, and

further patentable because it contains one or more additional features.

Accordingly, all claims are allowable over the prior art. Applicants respectfully assert that all claims are in condition for allowance.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts, at (781) 890-5678.

Respectfully submitted,



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